

What is Claimed:

1. A system for providing wireless communication services to a plurality of wireless subscriber devices that are located in an aircraft, comprising:

5 aircraft network means for generating radio frequency communication signals to communicate with at least one of said plurality of wireless subscriber devices;

air-to-ground network means for radio frequency communications between said aircraft and a ground-based communications system having at least one
10 transceiver located on the ground; and

aircraft interface means for interconnecting said aircraft network means and said air-to-ground network means to establish communications between said plurality of wireless subscriber devices and said ground-based communications network.

15 2. The system for providing wireless communication services of claim 1 wherein said aircraft network means comprises:

aircraft cellular communication means for establishing at least one cell site to communicate via communications with at least one of said plurality of wireless
20 subscriber devices.

3. The system for providing wireless communication services of claim 2 wherein said aircraft cellular communication means comprises:

at least one base station means, each of which establishes a cell site to
25 communicate via communications with at least one of said plurality of wireless subscriber devices.

4. The system for providing wireless communication services of claim 3 wherein said aircraft interface means comprises:

30 authentication means for verifying the identity of said plurality of wireless subscriber devices.

5. The system for providing wireless communication services of claim 3 wherein said aircraft interface means comprises:

authorization means for determining a set of services that each of said plurality of wireless communication devices is authorized to receive.

6. The system for providing wireless communication services of claim 3 wherein said air-to-ground network means comprises:

wireless subscriber device means, connected to said at least one base station means and responsive to receipt of radio frequency communication signals from a one of said plurality of wireless subscriber devices, for emulating operation of said one wireless subscriber device in communicating with said ground-based communications system.

7. The system for providing wireless communication services of claim 3 wherein said air-to-ground network means comprises:

transmitter means for generating downlink radio frequency signals for transmission to said at least one transceiver located on the ground;

receiver means for receiving uplink radio frequency signals received from said at least one transceiver located on the ground; and

antenna means located on an external surface of said aircraft for exchanging said downlink and uplink radio frequency signals between said transmitter and said receiver means and said at least one transceiver located on the ground.

8. The system for providing wireless communication services of claim 2 wherein said aircraft cellular communication means comprises:

a plurality of base station means to communicate via communications with at least one of said plurality of wireless subscriber devices, each of said plurality of base station means operating in a cellular technology that differs from those of the remaining ones of said plurality of base station means.

9. The system for providing wireless communication services of claim 8 wherein said aircraft interface means comprises:

data concentrator means for converting the individual traffic and signaling channels received from said plurality of base station means to an aggregate data stream.

10. The system for providing wireless communication services of claim 9 wherein said air-to-ground network means comprises:

ground station controller means for mobility management and hand over management for said plurality of wireless subscriber devices.

11. The system for providing wireless communication services of claim 9 wherein said air-to-ground network means further comprises:

a plurality of ground-based base station means for communicating with at least one of said plurality of wireless subscriber devices; and

data router means for disaggregating said aggregate data stream by technology into a plurality of data streams and delivering each of said plurality of data streams to a corresponding one of said plurality of ground-based base station means.

12. The system for providing wireless communication services of claim 9 wherein said air-to-ground network means further comprises:

a plurality of mobile switching system means for interconnecting said communications from at least one of said plurality of wireless subscriber devices with conventional Voice and Data switching systems.

13. The system for providing wireless communication services of claim 1 wherein said aircraft network means comprises:

aircraft cellular communication means for establishing at least one wireless LAN-based cell site to communicate via data-based communications

with at least one of said plurality of wireless subscriber devices.

14. A method for providing wireless communication services to a plurality of wireless subscriber devices that are located in an aircraft, comprising:

5 generating, in an aircraft network, radio frequency communication signals to communicate with at least one of said plurality of wireless subscriber devices;

generating, in an air-to-ground network, radio frequency communications between said aircraft and a ground-based communications system having at least one transceiver located on the ground; and

10 interconnecting said aircraft network and said air-to-ground network to establish communications between said plurality of wireless subscriber devices and said ground-based communications network.

15 15. The method for providing wireless communication services of claim 14 wherein said step of generating comprises:

establishing at least one cell site to communicate via communications with at least one of said plurality of wireless subscriber devices.

16. The method for providing wireless communication services of claim 20 15 wherein said step of establishing at least one cell site comprises:

operating at least one base station, each of which establishes a cell site to communicate via communications with at least one of said plurality of wireless subscriber devices.

25 17. The method for providing wireless communication services of claim 16 wherein said step of interconnecting comprises:

verifying the identity of said plurality of wireless subscriber devices.

30 18. The method for providing wireless communication services of claim 16 wherein said step of interconnecting comprises:

determining a set of services that each of said plurality of wireless

communication devices is authorized to receive.

19. The method for providing wireless communication services of claim 16 wherein said step of generating, in an air-to-ground network, comprises:

5 emulating, in response to receipt of radio frequency communication signals from a one of said plurality of wireless subscriber devices, operation of said one wireless subscriber device in communicating with said ground-based communications system.

10 20. The method for providing wireless communication services of claim 16 wherein said step of generating, in an air-to-ground network, comprises:

generating downlink radio frequency signals for transmission to said at least one transceiver located on the ground;

15 receiving uplink radio frequency signals received from said at least one transceiver located on the ground; and

exchanging said downlink and uplink radio frequency signals with said at least one transceiver located on the ground.

21. The method for providing wireless communication services of claim 20 15 wherein said step of establishing at least one cell site comprises:

operating a plurality of base stations to communicate via communications with at least one of said plurality of wireless subscriber devices, each of said plurality of base stations operating in a cellular technology that differs from those of the remaining ones of said plurality of base stations.

22. The method for providing wireless communication services of claim 21 wherein said step of interconnecting comprises:

converting the individual traffic and signaling channels received from said plurality of base stations to an aggregate data stream.

23. The method for providing wireless communication services of claim

21 wherein said step of interconnecting comprises:

mobility management and hand over management for said plurality of wireless subscriber devices

5 24. The method for providing wireless communication services of claim 22 wherein said step of interconnecting further comprises:

communicating via a plurality of ground-based base stations for communicating with at least one of said plurality of wireless subscriber devices; and

10 disaggregating said aggregate data stream by technology into a plurality of data streams and delivering each of said plurality of data streams to a corresponding one of said plurality of ground-based base stations.

 25. The method for providing wireless communication services of claim 15 22 wherein said step of interconnecting further comprises:

interconnecting, via a plurality of mobile switching systems, said communications from at least one of said plurality of wireless subscriber devices with conventional Voice and Data switching systems.

20 26. The method for providing wireless communication services of claim 14 wherein said step of generating, in an aircraft network, comprises:

establishing at least one wireless LAN-based cell site to communicate via data-based communications with at least one of said plurality of wireless subscriber devices.

25 27. A system for providing wireless communication services to a plurality of wireless subscriber devices that are located in an aircraft, comprising:

aircraft-based network means for generating radio frequency communication signals to communicate with at least one of said plurality of 30 wireless subscriber devices;

ground-based network means for interconnecting said communications

from at least one of said plurality of wireless subscriber devices with conventional Voice and Data switching systems; and

inner network means for interconnecting said aircraft-based network means and said ground-based network means to establish communications
5 between said plurality of wireless subscriber devices and said conventional Voice and Data switching systems.

28. The system for providing wireless communication services of claim 27 wherein said aircraft-based network means comprises:

10 aircraft cellular communication means for establishing at least one cell site to communicate via communications with at least one of said plurality of wireless subscriber devices.

29. The system for providing wireless communication services of claim 15 28 wherein said aircraft cellular communication means comprises:

at least one base station means, each of which establishes a cell site to communicate via communications with at least one of said plurality of wireless subscriber devices.

20 30. The system for providing wireless communication services of claim 29 wherein said aircraft-based network means further comprises:

authentication means for verifying the identity of said plurality of wireless subscriber devices.

25 31. The system for providing wireless communication services of claim 29 wherein said aircraft-based network means further comprises:

authorization means for determining a set of services that each of said plurality of wireless communication devices is authorized to receive.

30 32. The system for providing wireless communication services of claim 29 wherein said inner network means comprises:

wireless subscriber device means, connected to said at least one base station means and responsive to receipt of radio frequency communication signals from a one of said plurality of wireless subscriber devices, for emulating operation of said one wireless subscriber device in communicating with said
5 ground-based network means.

33. The system for providing wireless communication services of claim 32 wherein said air-to-ground network means comprises:

transmitter means for generating downlink radio frequency signals for
10 transmission to said at least one transceiver located on the ground;

receiver means for receiving uplink radio frequency signals received from said at least one transceiver located on the ground; and

antenna means located on an external surface of said aircraft for exchanging said downlink and uplink radio frequency signals between said
15 transmitter and said receiver means and said at least one transceiver located on the ground.

34. The system for providing wireless communication services of claim 28 wherein said aircraft-based network means comprises:

20 a plurality of base station means to communicate via communications with at least one of said plurality of wireless subscriber devices, each of said plurality of base station means operating in a cellular technology that differs from those of the remaining ones of said plurality of base station means.

25 35. The system for providing wireless communication services of claim 34 wherein said aircraft-based network means comprises:

data concentrator means for converting the individual traffic and signaling channels received from said plurality of base station means to an aggregate data stream.

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36. The system for providing wireless communication services of claim

35 wherein said ground-based network means comprises:

ground station controller means for mobility management and hand over management for said plurality of wireless subscriber devices.

5 37. The system for providing wireless communication services of claim 35 wherein said ground-based network means further comprises:

a plurality of ground-based base station means for communicating with at least one of said plurality of wireless subscriber devices; and

10 data router means for disaggregating said aggregate data stream by technology into a plurality of data streams and delivering each of said plurality of data streams to a corresponding one of said plurality of ground-based base station means.

15 38. The system for providing wireless communication services of claim 35 wherein said ground-based network means further comprises:

a plurality of mobile switching system means for interconnecting said communications from at least one of said plurality of wireless subscriber devices with conventional Voice and Data switching systems.

20 39. The system for providing wireless communication services of claim 27 wherein said aircraft-based network means comprises:

aircraft cellular communication means for establishing at least one wireless LAN-based cell site to communicate via data-based communications with at least one of said plurality of wireless subscriber devices.

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